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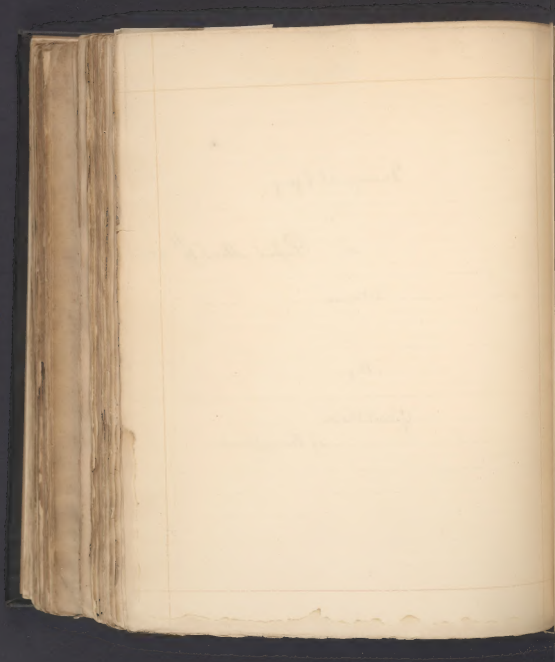
Inaugural Essay

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Tetanus

By

Gilbert Weston  
of Pennsylvania



## Inaugural Essay

There are few diseases to which the human frame is liable that are found in the generality of instances more intractable and which have baffled the ingenuity of man more than tetanus. Its existence appears to have been coeval with the first dawn of medical science and probably with the creation of man. For many centuries it was considered as almost inevitably fatal, nor have we much to boast of in the present state of our science, although since the introduction of opium as a remedy we have had a medicine in some measure capable of combatting the disease. The want of uniform success in its treatment has long been a subject of regret among medical men. Dr. Rush observes that it may be ascribed to the use of the same remedies, without any respect to the nature of the causes which produce the disease, and to an undue reliance upon some remedy, under a belief of its specific



efficacy. Opium has long been considered as its ant-  
dote, without recollecting that it was one only, of a great  
number of medicines, that are all alike useful in  
it.

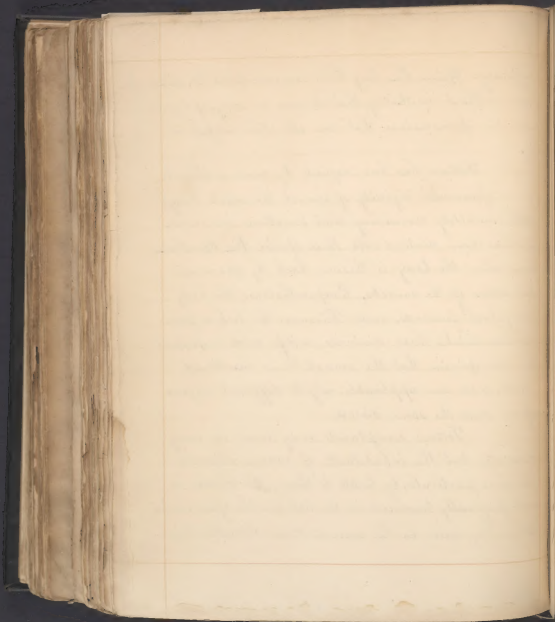
Tetanus has been defined by most authors to  
be a spasmodic rigidity of almost the whole body;  
with sensibility remaining and sometimes increased.  
It has been divided into three species viz. Opistho-  
tonos, where the body is thrown back by spasmodic  
contraction of the muscles, Emprosthotonos, the body  
being bent forwards, and Trismus, the locked jaw.  
Cullen thinks these divisions useless and improper;  
it is his opinion that the several terms mentioned  
anote, and are applicable only to different degrees  
of one and the same disease.

Tetanic complaints may occur in every  
climate; but the inhabitants of warm climates  
are more particularly liable to them; the disease is  
most frequently produced in the hot months of summer.  
When they occur in the more northern climates it is

It was my hope

The only reason I could find for  
the delay was that it was not  
yet possible to get the  
materials for the book  
which I had intended to  
publish. I had hoped to  
have it ready by the  
time I came to the  
city, but the delay was  
so great that I was  
forced to postpone it  
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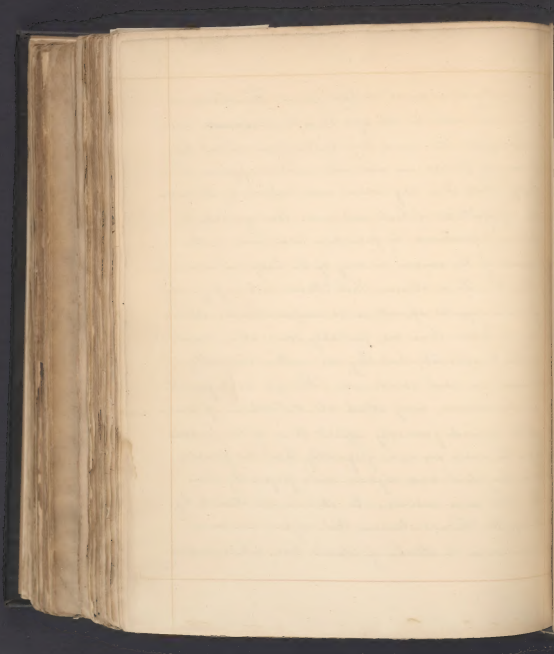
generally in a much milder form. This disease is  
to be met with in all ages, sexes, temperaments, and  
complexions. The causes, says Cullen, from whence they  
commonly proceed, are cold and moisture applied to the  
body while it is very warm, and especially the sud-  
den vicissitudes of heat and cold. But generally the  
disease is produced by punctures lacerations, or other  
lesions of the nerves in any of the body; in warm  
climates Lind observes that tetanus not unfrequently  
follows capital operations, as amputation &c. Accord-  
ing to Cullen there are, probably, some other causes  
of this complaint; but they are neither distinctly  
known, nor well ascertained. Though as before sta-  
ted, the disease may attack all, distinctions of persons  
; but it most generally afflicts those of the middle  
age, the male sex more frequently than the female,  
and the robust and vigorous more frequently than  
the weak and delicate. An idea is entertained by  
many, Dr. Thomas observes, that negroes are more  
predisposed to attacks of tetanus than white people;





they certainly are more frequently affected with it, but this circumstance does not arise from any constitutional predisposition but from their being more exposed to punctures and wounds in the feet from usually going barefooted, Tetanus is not confined to the human species. It not unfrequently attacks horses in the West Indies and other warm climates. Dr. Rush has seen several cases of the disease in horses. He has likewise known it to appear in the form of Crithetismus in a pigeon, brought on by a wound in one of its wings.

This disease sometimes comes on suddenly to a violent degree, but more frequently it approaches by slow degrees to its more violent state. In the latter case the symptoms of its approach are a stiffness in the lower extremities, soon followed by the same sensation in the back of the neck, which slowly increasing, renders the slightest motion of the head extremely difficult and painful. As this rigidity increases, there is commonly a sense of uncer-

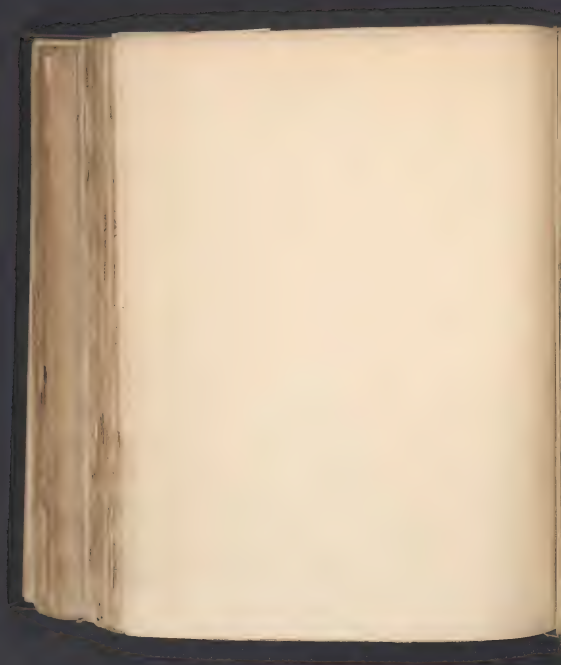


ness felt about the root of the tongue, together with  
some difficulty of swallowing and a great tightness  
is complained of about the chest, with a pain at the  
lower extremity of the sternum, shooting into the  
back, and stiffness likewise soon begins to take place  
in the jaws, which speedily augments to such a de-  
gree, that the teeth become so closely and firmly set  
together as not to admit of the smallest opening.

This is what is commonly called the locked jaw.

At this period of the disease, the pain at the ex-  
tremity of the sternum returns very frequently;  
the spasms of the back of the neck are also renewed  
with great violence and pain. As the disease  
advances, a greater number of muscles become  
affected, with spasms. The muscles of the spine  
are often violently affected, so as to draw the tru-  
nk of the body very forcibly backwards.

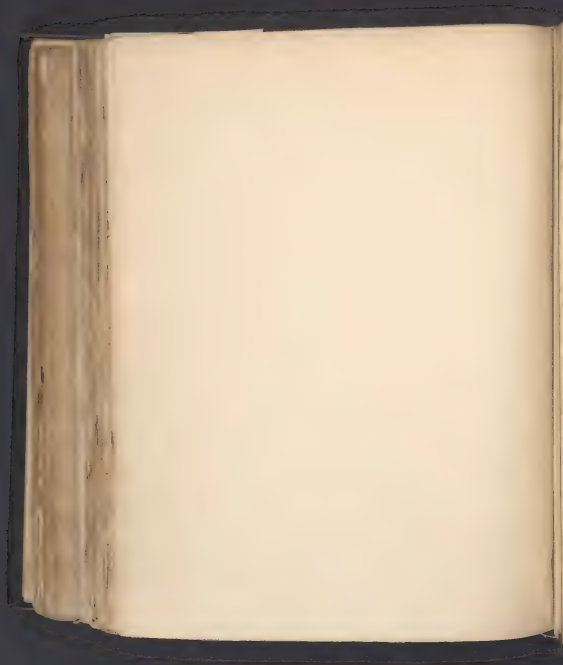
During the greater part of the continuance  
of the disease, the abdominal muscles are affected  
with violent spasms, so that the belly is strongly con-



and pass accordingly, and most frequently obli-  
que constipation prevails, and both the external and  
internal of the inferior extremities are commonly affected  
at the same time as so to have the limbs rigidly extend-  
ed.

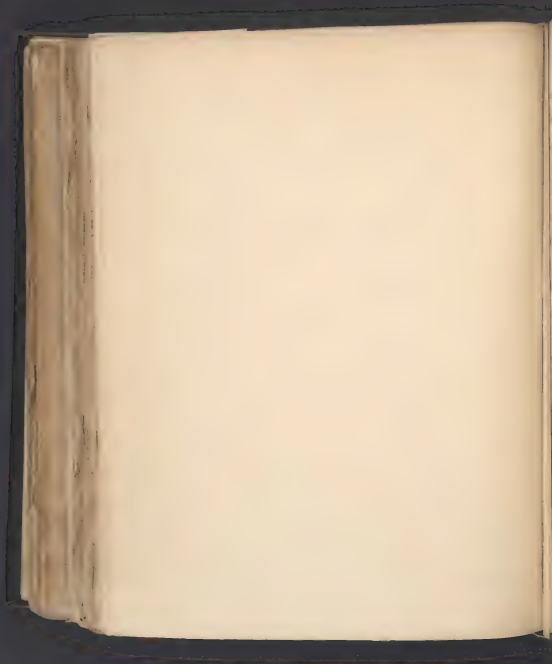
The flexor and extensor muscles of the hand  
and foot become at length equally affected and but-  
tress each other in their action keeping the body so  
rigidly extended and straight as to render it impossi-  
ble of being moved in any direction. The arms which  
were before little affected become stiff and extended,  
the tongue likewise suffers from spasm and being con-  
siderably deviated out of the mouth, is often in danger  
of being incarcerated by the teeth, and thus remains hang-  
ing together. It is to this state of the disease that  
the term tetanus has been strictly applied.

As the disorder continues to advance all the or-  
gans of voluntary motion become affected, the eyes  
appear fixed and immovable in their sockets, the  
involuntary fightingy motions, and especially the



most extreme distress, the strength at last becomes ex-  
hausted the pulse irregular, and an universal spasm  
puts a period to a miserable state of existence.

The characteristic speech of this disease  
as he is now seldom accompanied with fever. When  
the patient is present they however entertain a different  
opinion. Dr. Caldwell says he does not recollect ever  
to have seen a case of tetanus, in which the patient  
was entirely insensible before action. At the  
commencement of the disease the pulse is frequent  
full frequent, tense and strong. Blood drawn at  
this time throws up a quantity of coagulable lymph.  
The disease is frequently accompanied by violent  
pain though sometimes the patient complains of none.  
Last, the spasms are not constant but the con-  
vulsions of some convulsion in their character,  
but this convulsion is frequently of no more duration  
of ten or fifteen minutes duration, especially if  
the patient makes the least effort to speak, swal-  
low very difficult, or alter his position in bed.





When the complaint arises from a fracture  
of the injury, it must, nearly, prove fatal. In  
many cases, however, it does not, but in cases that  
arise under such circumstances, during a very  
late time, fracture and long extension in the lower  
limbs. The lockst, now arising as consequence of  
infection in a joint, is now, however, proved  
fatal. When these affections arise in conse-  
quence of an exposure to cold, they may in most cases  
be removed by a timely use of proper remedies,  
withdrawing a considerable space will probably  
elapse before the patient will be able to perform  
his former strength. Although there is sometimes  
a great relaxation in the spines of the bones that  
they are apt to return with some with power, and  
in this respect we should be careful how we re-  
move the patient and of danger. In some cases,  
the patient is destroyed in four or five days in  
these the very temporary marks.

Dr. Hall, in his treatise of Tetanus



and *Arctia bontopica* has made the following im-  
pression on the soil of its country, it passes by the  
first day, and each week in the month a quantity of  
humus and the heat in a minute, he believes the  
soil is always renewed; of so the New Land.  
In the first day, the humus and heat  
is in a minute, you observe the appearance of the  
legions in which he will not die.

The first impression in the treatment of  
the disease, is to remove it from the cause  
for which it originates. If you wish to prevent  
you a wound or fracture, the wound, and a person  
properly to be examined, and an extensive sub-  
stance that may have lodged there, should be exten-  
sive, taking care at the same time to select most  
fully lay open the wound.

Advantage has sometimes been ac-  
crued from passing a small quantity of a strong  
solution of opium into the wound, saying it af-  
fects with little effect in the same, and being



is placed spread with oyster the ointment on  
the whole. Every time the ointments are removed,  
the wound is again to be wetted with the solution  
of opium.

The greatest cause of a wound has been  
by some writers supposed to give rise to tetanic  
affections. It has therefore been considered, when the  
wound is to be the end, to make a deep incision into  
the part which has been injured, so as to divide the  
tendons and nervous fibres entirely, after which  
is proper the use of treatment that has been pro-  
posed.

Another application, particularly of the hand  
is made by means of a pencil, and after  
wards covering the part with a warm bandage and  
with poultices with the view to absorb suppuration  
or even as, after this is another mode of treatment  
which has been frequently pursued in the case  
of a wound.

The interesting and the treatment is



small piece of thick wet mist spirit of turpentine,  
which soon brings on inflammation, and thereby pre-  
vents a cure. The eruptions has been accounted  
for by Samson. Dr. Meadison of Baltimore in the third  
number of the even Medical and Physical Journal,  
page 226, gives the following account of a case  
which in this manner. At about twenty, black  
woman, aged about thirty-five a few years in  
most of her life, happened to tread upon a piece of  
teps, which wounded her foot near the first joint  
of the little toe. It drew rapidly and no attention  
was paid to it. At the expiration of three weeks  
she was suddenly seized with a spasm in the  
muscles of the lower jaw, accompanied with intel-  
ligible pain, particularly near the coronoid and  
mylohyoid processes. This, in spite of large quanti-  
ties of opium, increased, and a quantity of the low-  
er jaw was forced to such an extent that she  
could not masticate her food. Two grains of  
nitrous were given every two hours without any





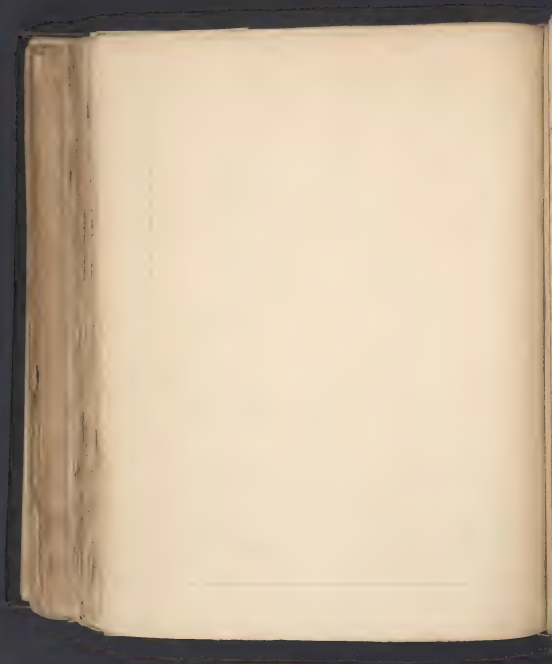
alluviation of the symptoms. In this dreadful state the Doctor made an incision about half an inch deep, and an inch and a half in length, immediately above the cicatrix, in a transverse direction, and then poured strong spirits of turpentine into the wound. In a few minutes violent pain was created in the part; in half an hour the fumes left the jaws; and in a few hours more the patient entirely recovered. The pain in the wound became excessive, and continued so for four or five hours; but the business was completely moved, we did it afterwards over. Little or no suppuration ensued, the wound healing by the first intention, or adhesive inflammation.

There is perhaps no remedy which has been employed with greater success in this disease than opium used internally; it should be given in doses graduated according to the urgency of the case. Dr Caldwell says as far as the experience of the physicians of Philadelphia



enables him to speak, opium, wine, and mercury, appear to be the only remedies on which any reliance can be placed in the treatment of tetanus. Of these, the two former retard the progress of the disease, preventing exhaustion and death, from the violence of the spasms until the latter has had time to eradicate it entirely, by converting the tetanic into the mercurial action. Opium and wine, being in their natures, rather paretic than curative remedies, are insufficient of themselves, without mercury; while, without their aid, mercury is too slow in its operation to arrest the rapid march of the disease. Some of the most celebrated surgeons of the present day, however, place implicit confidence in opium and make use of no other remedy.

It has been Dr. Physick's practice — ~~no~~ higher authority cannot be cited — to give opium in injections, in doses of from five to eight grains, frequently repeated, until the

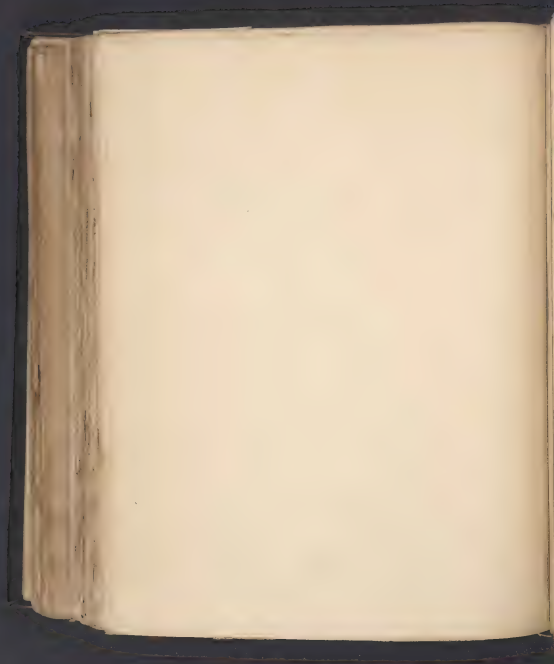


grows to become, with a proper instrument, elevating, in the neighbourhood of different parts of the long ligaments of increased resistance.

The spasm being subdued, he relaxes the use of force until they manifest a disposition to return, when he immediately recurs to the same remedy, and is similar to the one. In the meantime, the application of the incision is continued, until a pyelitis be produced; when the patient is considered in some measure out of danger.

Dr. Ferrius observes that he never gave the medicinal pills of treatment to women, but confesses that he very seldom tried it.

Among the functions of the uterus, external injuries and, particularly of the kind, the insertion of punctured into the wall of the uterus, by means of the scalpel, and the secretion of suppuration in laceration wounds is also considered highly beneficial. These things of more importance



17 apt. the injury has been received, and be-  
fore the occurrence of tedious symptoms are gene-  
rally attended with the greatest advantage; 1. 1.  
if calomel until吐瀉 has made its appearance  
it is generally considered of no avail and only  
subject the patient to a great deal of unnecessary  
pain. When the disease is fairly formed, all  
local applications to the injured part are unavailing:  
even the manipulation of the limb has been  
found insufficient to cure the complaint.

Application of ley, blister and sin-  
apisms to the part has been found very injurious  
where circumstances exist to prevent abolition of  
a putrid matter. So the production of suppu-  
ration, in lacinated wounds by spirit of turpentine  
as before mentioned is a solution of emulsion sub-  
limata, followed by poultices, frequently resorted  
to amongst the best applications. Friction of  
castor oil has also been successfully used for  
the same purpose.





Dr. Rush says he has seen the happiest  
effects arise from exhibiting the oil of turpentine in  
dinner, at 10. 30. 40. 50. 60. 70. 80. 90. 100. 110. 120. 130. 140. 150. 160. 170. 180. 190. 200.  
three hours. Dr. Rush also in his observations on  
letimus mentions a case in which without spirits  
proved successfull. A quack in Essex England  
succeeded in curing letimus by giving ardent spi-  
rits in such quantities as to produce intoxication.  
Upon being asked his reason for this strange practi-  
ce he said he had always observed the power to cure  
letimus more, and more, being that would pro-  
duce that effect, he thought would be proper to  
have done.

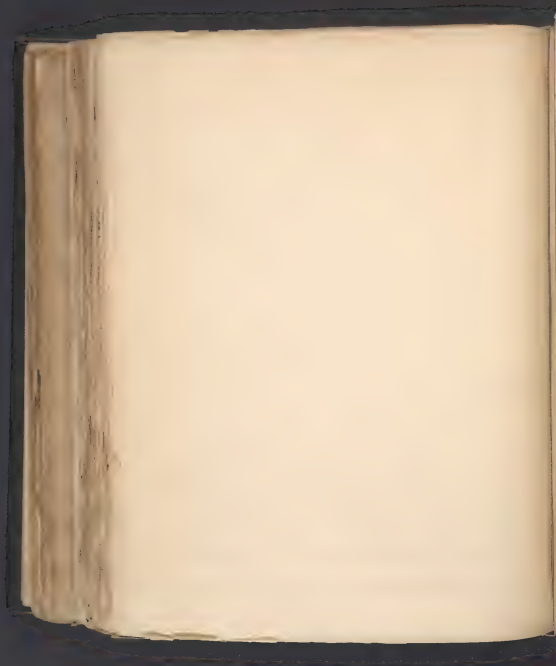
Impetation in cases of letimus arising  
from wounds in the limbs has been highly recom-  
mended by some of the French surgeons, and particu-  
larly by Lally who acted as surgeon in chief to the  
French army during the war in Egypt and Syria.  
He says that he found it to succeed in some cutane-  
ous affections, such as, and other diseases had



was sent in vain. Even where the case termin-  
ated fatally, he found that the operation relieved  
the symptoms very considerably.

A great number of remedies that I  
have not enumerated have been used by different  
physicians with more or less advantage. The  
one treatment I should be inclined to adopt  
in this disease would be precisely similar to the  
one pursued by Dr. A. in the treatment of  
epilepsy in very large cases.

Dr. Clark in his Treatise on that Indian  
distemper informs us, that, being unable to cure the  
symptomatic tetanus, he was induced to perform it  
and on this purpose, after various and fruitless  
attempts to give him a thousand of calomel twice a  
day, but a gentle irritation came on, and he per-  
formed the same operation. That of fif-  
teen patients after amputation, that were treated in  
this way, only one died, and he was in a critical  
state before that but consequences were dreaded.



In those who had been wounded, the success was greater; two only having been lost out of a great number since this mode of practice was commenced.

That this mode of prevention is not proper in the West Indies I shall not pretend to say, but certainly it would not be considered the most judicious practice in this country to excite a pyæmia in every case of punctured wound, or after amputation. I understand it is almost a universal practice on board ships of war, to mix tincture of opium with the dressings, and that since the practice has been adopted, these complaints seldom occur. As a preventive. I should be much inclined to prefer it to that proposed by Dr Black.

Dissections of persons dying of this disease have cast but little light upon it. slight effusions within the cranium have been observed in a few instances; but in by far the greater number nothing particular has been discovered either



in the brain or any other organ. In some instances however the blood is not found to coagulate, but fluid like molasses as in persons killed by lightning, appearing to indicate that the whole muscular fibres of the arterial system had partaken of the general spasmodic action. The nerves have also been examined after death, from the place of injury to their central termination, but no inflammation has been observed in any part of their course: the supposition therefore that an inflamed nerve is the cause of the disease is unfounded.

